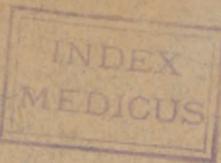


Smith (W. F.)



I. CASE OF CORNEAL TRANSPLANTATION FROM
THE RABBIT'S TO THE HUMAN EYE.

II. A SINGULAR CASE OF INJURY.

Compliments of the Writer.

BY

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COOK COUNTY HOSPITAL; OPHTHALMIC SURGEON TO THE ALEXIAN
BROTHERS' HOSPITAL; OCULIST AND AURIST TO THE
EMERGENCY HOSPITAL, CHICAGO.

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CASE OF CORNEAL TRANSPLANTATION FROM THE RABBIT'S TO THE HUMAN EYE; RESULT NOT VERY FAVORABLE.

BY WILLIAM F. SMITH, M.D.

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ALEXIAN AND EMERGENCY HOSPITALS.

(*With Two Figures*).

December 6, 1888, Mary Katus, a Polish woman, was brought to my office by her brother. She is twenty-seven years old, very delicate, and slightly built. When she was three years old she suffered from an attack of small-pox, which left her totally blind.

The bulb of the left eye is soft and partially atrophied. The corneal membrane is entirely changed into cicatricial tissue. There is no perception of light. The sightless ball diverges and is in constant motion.

The right eye is nearly normal in size and tension. A dense leucoma occupies almost the entire extent of cornea, leaving only a very narrow margin (less than 1 mm in width) of partially transparent membrane just within the sclero-corneal junction. There is no visible anterior chamber, the iris apparently being firmly united to the posterior surface of the leucoma. The tension is not quite normal, making it probable that the lens was evacuated when the cornea was ruptured. Light perception, however, is good and the phosphenes are easily excited.

According to Von Hippel's rules it did not seem a case for which a transplantation could be done successfully. The relatives were very persistent, however, and I finally consented to make the attempt.

Von Hippel's instrument not being available, I had one made by Messrs. Sharp & Smith, of this city,—a simple trephine without spring or clock work. It consists of a cutting-cylinder 4 mm in diameter and 10 mm long. This is cup-shaped, and perforated through its bottom, the perforation furnished with a screw thread. Into this is screwed a shaft, 2 inches long, furnished with a milled head. Cutting-cylinder with shaft attached is shown at *A*, Fig. 1. Over the shaft fits a metal cylinder just long enough to play

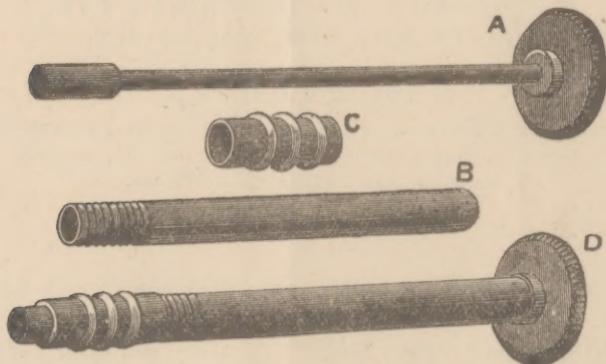


FIG. 1.

freely between the end of the cutting-cylinder and the milled head of the shaft. One end of this cylinder is furnished with a screw thread for the hood, *C*, which moves over the cutting-cylinder. The instrument, when put together for use, is represented at *D*. By means of the hood the depth of the incision may be exactly graded. The free end of the hood is square-cut. Its inner edge plays as closely as possible to the outer surface of the cutting-cylinder.

The patient was assigned a bed in the Emergency Hospital. A healthy rabbit, one year old, was procured. The operation was made December 13. The most thorough antiseptic precautions were taken before, during, and after the operation. I was assisted by Dr. Hall and Mr. Schwann. Anæsthesia by chloroform was carried to as complete a degree as safety would allow. The patient proved a most excellent subject for chloroform, and took it kindly, with no struggle or any tendency to vomit.

The hood of my little instrument was fixed so as to expose exactly 0.9 mm of the cutting-cylinder. The point chosen for

its action was about 2 mm downwards and inwards from the centre of the cornea. The instrument was held firmly with the left hand, while the milled head of the shaft was turned slowly with the right, so that the cutting edge, which was as sharp as it could be made, sank readily and evenly into the cicatrized cornea. The button to be removed was fixed by the fixation bident, with points reversed, and drawn upwards while it was carefully cut out with a small Graefe knife. This I found to be a very delicate piece of work, but was reasonably successful. The bottom of the mortise thus made was still opaque, except in one small spot not larger than half of the area of a pin's head, and it was impossible to determine whether or not this was a remnant of the membrane of Descemet. Further efforts to clear away tissue were abandoned for fear of penetrating the bulb. There was some little bleeding from the margins of the cut, which was stilled by a few drops of a solution of boric acid. The rabbit was now slightly narcotized with chloroform, and a few drops of a 10 % solution of cocaine were allowed to fall on its cornea. The nictitating membrane, or third lid, was cut across with a strong pair of scissors, as was also the orbicularis at the external canthus. This was done to prevent interference by spasmotic action on the part of these muscles.

The hood over the cutting-cylinder was moved back so as to expose several millimeters of the free end, and an attempt was made to cut through the clear cornea at one turn of the cylinder. This failed. The division was not complete, and as it was impossible to replace the knife so that it would complete the incision, the other eye of the rabbit had to be prepared. This was done after some little delay, when the second attempt, during which several turns of the cylinder were made, was entirely successful. The button of the rabbit's cornea had been forced up into the cup of the cutting-cylinder. The instrument was taken apart, and after the shaft had been removed the cutting-cylinder was fitted into the mortise already prepared in the patient's eye, and the button of cornea from the rabbit was forced down into it by means of a wooden tooth-pick fashioned for the purpose. The transplanted membrane lodged snugly in the place designated for it. It will be remarked that its surfaces had not been handled or in any way interfered with by any harsh instrument after it had left its natural location. The eyelid was drawn down over it and held by the hand of an assistant while

the patient was, as gently as possible, brought from under the influence of the chloroform. The fact before mentioned, that there had been no vomiting, was of great assistance in carrying out the details of the operation.

The importance of remaining perfectly still was impressed upon the patient. She was carried to her bed, and I think I can say she did not move for twenty-four hours; a trained nurse was at her side during all that time, and so assured me. To this fact, and to the gentle, tractable nature of the patient, is due the perfect union that occurred, and was maintained till the healing process was complete. No bandage or packing was used other than a simple strip of gauze fastened round the head in such a manner as to hold the lids gently closed. I should have stated that the patient's face and eye had been cleaned with a boiled, saturated solution of boric acid, and with sterilized water. None of the usual irritating, antiseptic solutions had been used about the eye operated on.

For seven days the patient was kept, for the most part, in a recumbent position, after which she was allowed some liberty. The healing process seemed to be complete in about two weeks, and in three weeks after the operation she returned to her home in Streator, Illinois.

At the time of leaving the hospital the transplanted piece was slightly elevated above the surrounding tissues, but the margin of union was smooth and presented no evidence of irritation. The button of rabbit's cornea had retained its transparency, but rested upon an opaque surface, except at the small spot before mentioned, which was dark, and through which evidently some light reached the fundus. She could see any object held between the eye and the light, but could tell nothing about outlines. More could not be expected from one who had been so long totally blind.

About six months after the operation I was informed by the relatives of the girl that she could do "ordinary house-work"; and a few weeks ago a paragraph appeared in a local paper to the same effect. I had repeatedly written for the parents to bring the girl to the city in order to be able to report upon the condition after so many months. For some reason they were not able to come till last week, when her brother again brought her to the office.

Her general health has very much improved. She is now robust and stout. The transplanted piece of cornea has sunk to a level with the surrounding tissues, indeed somewhat below them, especially at the centre, so that it appears like a facet polished on the surface of a sphere. The tissue upon which it has grown is not any more transparent than before. The small spot still has the dark appearance that indicates partial transparency, and she can now tell something about the outlines of objects held between her and the light. Her brother says she can tell the "chickens from the dogs and cats and other animals in the farm-yard," and that "she does considerable work about the house." The accompanying drawing, Fig. 2, is a rough sketch of the eye as it now appears to me.

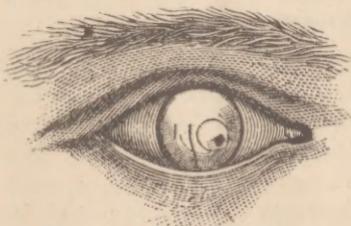


FIG. 2.

The line separating the transplanted piece from the rest of the cornea is not quite as well marked as here represented, and I have failed to show the facet-like appearance spoken of. The curved line passing from the centre of the cornea downward is a blood-vessel. The spot to the left of it indicates the location of a chalk-like deposit (calcareous matter) in the thickness of the leucoma. On examining closely the transplanted portion with a lens, it is easily recognized as transparent, and the bottom of the mortise can be seen as a rough surface dotted over by very fine points of the same chalk-line deposit. In the lower, inner quadrant is seen the dark, semi-transparent portion before described.

Both the patient and her brother say that her vision is improving. For some reason the very narrow margin of cornea described as existing at the first examination near the sclero-corneal junction seems to have widened, and the blue of the underlying iris is more perceptible. Perhaps her improved general health, and consequently increased activity, constitute

the reasons her relatives have for believing that her vision is actually improving.

I have attempted corneal transplantation five times in hospital practice, and this is the only case approaching success. It must be acknowledged that in it the circumstances were exceptionally favorable to successful union. The result cannot be considered very favorable. It only shows that in a case of central leucoma the cicatricial tissue of which does not include the membrane of Descemet, and where an anterior chamber still exists, a transplantation may be successful, and the transparency of the transplanted section may be maintained. But in just such a case an iridectomy would be a far preferable operation.

204 Dearborn St., CHICAGO, March 26, 1890.

A SINGULAR CASE OF INJURY—BLINDNESS FROM A PENETRATING WOUND OF CHEEK AND ORBIT.

BY WILLIAM F. SMITH, M.D., OF CHICAGO.

January 2d, of this year, I was called, in consultation with Drs. Lee and Murphy, to see a boy who had become blind in his left eye from an accident.

The patient, twelve years old, healthy and well developed for his age, gave the following account of the injury. Himself and a few companions had been playing in a stable near his father's house. They were in a hay-loft, and he had accidentally fallen through a concealed opening to the floor below. One of his companions had been chasing him about the loft, and had in his hand a hay-fork with two tines. This fork fell, or was thrown, through the opening at the moment our patient fell, and when he reached the floor one of the tines of the fork went into his cheek. The fall in itself did not hurt him; he was not bruised or dazed, but pulled the tine out of his cheek himself. When asked how far it had penetrated, he held up his hands so as to indicate about two and a half or three inches. He started to the house with his little friends. When he got to the door-step, he says he noticed that he was blind in the left eye. He was sure about this, because he said he had accidentally closed the right eye and found that he could see nothing at all with the other.

The mother said the boy had complained of very little pain, but being very much alarmed she had sent for the nearest doctor, who had simply put a few drops of an eye-water in the eye, the purpose of which she did not know.

The accident had happened forty-eight hours before I saw him.

Upon examining the eye we found that the pupil was dilated, but as the physician who had been first called had evidently used a solution of atropine, this was of no significance. The most careful tests failed to show that there was any perception

of light in this eye. The ophthalmoscope showed the optic mediae perfectly clear, and the circulation of the fundus normal.

On the left cheek, about half an inch below the alveolar process of the superior maxillary bone, and about half way between the chin and the angle of the lower jaw, was a small penetrating wound. It could be traced upwards, backwards, and inwards entirely through the cheek. Opposite the wound in the inner side of the cheek another opening, evidently the continuation of the wound, was found in the mucous membrane over the alveolar process, and near the root of the second molar tooth. There was no discharge from this opening, and we did not penetrate it to any depth. There was no evidence of fracture anywhere, yet we had to conclude that the wound was in some way responsible for the blindness. The patient showed no evidence of any inflammatory process, there was no elevation of temperature, no headache, and no symptoms of cerebral lesion.

Upon returning to the office I took a skull to examine the relation of the parts. With a letter-opener, which is a long, narrow blade, I was surprised to see that when I pressed its point against the alveolar process of the second molar in the direction of the wound we had been examining, it found its way directly through the spheno-maxillary fissure at about its centre, across the apex of the orbit, and exactly bisected the optic foramen, the point being arrested by the upper anterior wall of that foramen. Indeed, pressing the point of the instrument anywhere within half an inch of the spot first chosen, the bones of the neighborhood formed a sort of funnel, which drove the instrument directly to the optic foramen. I was therefore forced to the conclusion that the tine of the fork had actually crushed the optic nerve just where it enters the orbit.

I have since made three examinations of the patient at intervals of ten days. At the last occasion I was able to determine that the optic disc had lost some of its color. The *arteria centralis retinae*, however, seemed as prominent as ever, and the rest of the fundus had undergone no change. The eye became considerably diverged, and was displaced upwards. The pupil was dilated to a medium degree when the other eye was covered, but reacted promptly with the other. There has never been the slightest light-perception since the accident. I have kept the eye under observation with considerable interest.

Has any *confrère* ever heard of a similar case?

